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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,207	09/15/2003	Albert Chan	02EK-105601	2364

30764 7590 06/28/2006

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EXAMINER	
GOFF II, JOHN L	

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 06/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/663,207	CHAN, ALBERT	
	Examiner	Art Unit	
	John L. Goff	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on 4/11/06.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

3. Claims 1, 3, 4, 6, 7, 9-13, 16, 17, 19-23, 28, 29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen (U.S. Patent Application Publication 2001/0038093).

Nguyen discloses a method of attaching an electronic component (e.g. integrated circuit (IC) chip) to a heat-dissipating surface (e.g. heat sink a component which has a different coefficient of thermal expansion than an IC chip) through a dispensable liquid curable adhesive paste having a relatively low viscosity. Nguyen teaches the adhesive comprises a liquid curable polymer (e.g. silicon-based and liquid at room temperature), fusible filler such as solder powder (e.g. Sn/Bi, Sn/Ag/Cu, etc. having a melting point less than 235 °C and a thermal conductivity greater than 20 W/mK), fluxing agent, and non-fusible filler (e.g. copper or silver metallic particles having a high melting point, particle size of 0.02 to 0.1 mm, and thermal conductivities of 400 W/mK or more). Nguyen teaches that during application the adhesive is heated to above the melting point of the solder powder and the curing temperature of the curable polymer to cure the adhesive and form the adhesive into a compliant material (Paragraphs 6-8, 14, 15, 22, 26, and 30-32).

Regarding the limitation "such that the solder reflows to form interconnecting metal structures dispersed in the polymer matrix prior to the time the polymer becomes cured", Nguyen teaches an adhesive mixture comprising a curable polymer composition, a solder powder, and a fluxing agent wherein during application the adhesive is heated above the melting point of the solder powder and the curing temperature of the curable polymer for a time sufficient to cure the polymer. Thus, as the materials and steps of Nguyen are the same as those both claimed and disclosed in applicants specification which result in reflow of the solder powder to form interconnecting metal structures while the curable polymer composition is cured the limitation appears inherent to Nguyen.

Regarding claim 10, Nguyen does not require forming the adhesive under any elevated heating conditions and the adhesive is liquid dispensable such that it appears inherent the adhesive is formed at less than 80 °C.

Regarding claim 23 and the limitation "thereafter curing said polymer such that the adhesive paste hardens", applicant has used the term "harden" interchangeably with "cured" as shown by claim 1 which requires the polymer becomes "cured" and in the specification at paragraphs 11, 20, and 27. Thus, as Nguyen teaches the adhesive is cured, the adhesive is also hardened, it being noted both Nguyen and applicants disclose using silicone polymer resins. Furthermore, Nguyen teaches the adhesive is cured to form a compliant material, i.e. a hardened material having elasticity, and applicants specification in paragraph 22 specifically notes "Finally, after being cured the polymer should provide good adhesion and have sufficient elasticity to absorb any stresses generated by thermal cycling or other mechanical causes."

(Emphasis added) such that inherently curing the adhesive in Nguyen to form a compliant material also hardens the adhesive.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, 31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (U.S. Patent 6,926,955) in view of any one of Kirsten (WO 97/07542), the background of McCormack et al. (U.S. Patent Application Publication 2001/0030062), or Pennisi et al. (U.S. Patent 5,128,746).

Jayaraman et al. disclose a method of attaching an electronic component (e.g. integrated circuit (IC) chip) to a heat-dissipating surface (e.g. heat sink including those that are actively cooled which has a different coefficient of thermal expansion than an IC chip) through a dispensable liquid curable adhesive paste having a relatively low viscosity. Jayaraman et al. teach the adhesive comprises a liquid curable polymer (e.g. epoxy or silicon-based), fusible filler such as solder powder (e.g. Sn/Bi, Sn/Pb, Sn/Ag, Sn/Ag/Cu, etc. having a melting point less than 235 °C and a thermal conductivity greater than 20 W/mK), and non-fusible filler (e.g. silver metallic particles having a high melting point and a thermal conductivity of 400 W/mK or more). Jayaraman et al. teach that after application the adhesive is heated to above the temperature of the solder powder to melt the solder powder and reflow the solder to form interconnecting metal

structures and cure the adhesive followed by cooling the adhesive (Figures 3 and 4 and Column 3, lines 34-38 and 49-66 and Column 4, lines 9-19 and 49-56 and Column 5, lines 33-56 and Column 6, lines 22-47 and 57-61). Jayaraman et al. do not specifically teach including a fluxing agent in the adhesive. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include within the adhesive taught by Jayaraman et al. a fluxing agent to remove surface oxides from the solder powder and allow the solder powder to better wet out as was well known in the art and shown for example by any one of Kirsten, the background of McCormack et al., or Pennisi et al.

Kirsten discloses a method for bonding electronic components using a dispensable liquid curable adhesive paste including a solder reflow process to form interconnecting metal structures followed by curing the adhesive. Kirsten teaches the adhesive comprises a liquid curable polymer (e.g. epoxy), fusible filler such as solder powder (e.g. Sn/PB, etc. having a melting point less than 235 °C and a thermal conductivity greater than 20 W/mK), and fluxing agent. Kirsten teaches the fluxing agent is added to remove surface oxides from the solder powder and allow the solder powder to better wet during reflow and curing of the adhesive (Page 3, lines 6-8 and Page 13, lines 4-38 and Page 17, lines 11-37). The background of McCormack et al. discloses a dispensable liquid curable adhesive paste used in bonding electronic components comprising a curable polymer, fusible filler such as solder powder (e.g. Sn/PB, etc. having a melting point less than 235 °C and a thermal conductivity greater than 20 W/mK), and fluxing agent. The background of McCormack et al. teach the fluxing agent is added to remove surface oxides from the solder powder (Paragraph 2). Pennisi et al. disclose a method for bonding electronic components including solder interconnects through a dispensable liquid curable adhesive paste

wherein the adhesive includes fluxing agent to remove surface oxides from the solder powder and allow the solder powder to better wet during reflow and curing of the adhesive (Column 2, lines 61-64 and Column 3, lines 9-19 and 57-65).

Regarding claim 10, Jayaraman et al. do not require forming the adhesive under any elevated heating conditions and the adhesive is liquid dispensable after forming such that it appears the adhesive is formed at room temperature and the limitation is met. In any event, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the optimum forming temperature for the adhesive taught by Jayaraman et al. as modified by any one of Kirsten, the background of McCormack et al., or Pennisi et al. as doing so would have required nothing more than ordinary skill and routine experimentation.

Regarding claim 23 and the limitation "thereafter curing said polymer such that the adhesive paste hardens", applicant has used the term "harden" interchangeably with "cured" as shown by claim 1 which requires the polymer becomes "cured" and in the specification at paragraphs 11, 20, and 27. Thus, as Jayaraman et al. teach the adhesive is cured, the adhesive is also hardened, it being noted both Jayaraman et al. and applicants disclose using silicone or epoxy polymer resins. Furthermore, Jayaraman et al. specifically teach that below the operating temperature of the bonded electronic component the adhesive is solid, i.e. hardened, (Column 4, lines 33-35) such that cooling of the cured adhesive as taught by Jayaraman et al. during bonding hardens the adhesive and the limitation is met.

Regarding claim 33, Jayaraman et al. do not specifically teach the curing temperature of the curable polymer is lower than the melting point of the solder. However, as the materials

taught by Jayaraman et al., i.e. silicone or epoxy curable polymer and Sn/PB solder, are consistent and in agreement with those claimed and disclosed by applicants specification it appears intrinsic to Jayaraman et al. that the curing temperature of the curable polymer is lower than the melting point of the solder. In any event, absent any unexpected results it would have been obvious to one or ordinary skill in the art at the time the invention was made to use as the curable polymer and solder powder any of those taught by Jayaraman et al. as modified by any one of Kirsten, the background of McCormack et al., or Pennisi et al. including combinations resulting in the curing temperature of the curable polymer lower than the melting point of the solder as doing so would have required nothing more than ordinary skill and routine experimentation.

6. Claims 1, 3, 4, 6, 7, 9-14, 16, 17, 19-23, 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen in view of Jayaraman et al.

Nguyen is described above in full detail. As noted above it appears reflow of the solder material to form interconnecting metal structures is intrinsic to Nguyen. In any event, it would have been obvious to one of ordinary skill in the art at the time the invention was made that during the melting of the solder powder and curing of the adhesive taught by Nguyen the solder powder would reflow to form interconnecting metal structures in the adhesive as was known to occur in the art for similar processes as shown by Jayaraman et al.

Jayaraman et al. is described above in full detail.

Regarding claim 10, Nguyen does not require forming the adhesive under any elevated heating conditions and the adhesive is liquid dispensable after forming such that it inherent the adhesive is formed at less than 80 °C. In any event, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to experimentally determine the forming temperature for the adhesive taught by Nguyen as modified by Jayaraman et al. as doing so would have required nothing more than ordinary skill and routine experimentation.

Regarding claim 14, Nguyen does not specifically teach an actively cooled heat-dissipating surface. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use in the method taught by Nguyen heat-dissipating surfaces that are actively cooled as was well known in the art as shown for example by Jayaraman et al. wherein only the expected results would be achieved.

Regarding claim 23 and the limitation "thereafter curing said polymer such that the adhesive paste hardens", applicant has used the term "harden" interchangeably with "cured" as shown by claim 1 which requires the polymer becomes "cured" and in the specification at paragraphs 11, 20, and 27. Thus, as Nguyen teaches the adhesive is cured, the adhesive is also hardened, it being noted both Nguyen and applicants disclose using silicone polymer resins. Furthermore, Nguyen teaches the adhesive is cured to form a compliant material, i.e. a hardened material having elasticity, and applicants specification in paragraph 22 specifically notes "Finally, after being cured the polymer should provide good adhesion and have sufficient elasticity to absorb any stresses generated by thermal cycling or other mechanical causes." (Emphasis added) such that intrinsically curing the adhesive in Nguyen to form a compliant material also hardens the adhesive.

Regarding claim 33, Nguyen does not specifically teach the curing temperature of the curable polymer is lower than the melting point of the solder. However, as the materials taught by Nguyen, i.e. silicone curable polymer and Sn/Bi, Sn/Pb, Sn/Ag, or Sn/Ag/Cu solder, are

consistent and in agreement with those claimed and disclosed by applicants specification it appears intrinsic to Nguyen as modified by Jayaraman et al. that the curing temperature of the curable polymer is lower than the melting point of the solder. In any event, absent any unexpected results it would have been obvious to one or ordinary skill in the art at the time the invention was made to use as the curable polymer and solder powder any of those taught by Nguyen as modified by Jayaraman et al. including combinations resulting in the curing temperature of the curable polymer lower than the melting point of the solder as doing so would have required nothing more than ordinary skill and routine experimentation.

7. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen.

Nguyen is described above in full detail. Nguyen does not specifically teach the curing temperature of the curable polymer is lower than the melting point of the solder. However, as the materials taught by Nguyen, i.e. silicone curable polymer and Sn/Bi, Sn/Pb, Sn/Ag, or Sn/Ag/Cu solder, are consistent and in agreement with those claimed and disclosed by applicants specification it appears intrinsic to Nguyen that the curing temperature of the curable polymer is lower than the melting point of the solder. In any event, absent any unexpected results it would have been obvious to one or ordinary skill in the art at the time the invention was made to use as the curable polymer and solder powder any of those taught by Nguyen including combinations resulting in the curing temperature of the curable polymer lower than the melting point of the solder as doing so would have required nothing more than ordinary skill and routine experimentation.

8. The following rejections were set forth in paragraphs 7-24 of the office action mailed 11/8/05 and as applicant has not argued the rejections individually they remain the same and are not repeated here for brevity.

9. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen optionally in view of JP2001284401.

10. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. and any one of Kirsten, the background of McCormack et al., or Pennisi et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of JP2001284401.

11. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of JP2001284401.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen in view of Koning et al. (U.S. Patent Application Publication 2003/0150604).

13. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. and any one of Kirsten, the background of McCormack et al., or Pennisi et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Koning et al.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Koning et al.

15. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen in view of Dietz (U.S. Patent 6,265,471).

16. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. and any one of Kirsten the background of McCormack et al., or Pennisi et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Dietz.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Dietz.

18. Claims 18 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen in view of Bish et al. (U.S. Patent 6,906,413).

19. Claims 18 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. and any one of Kirsten, the background of McCormack et al., or Pennisi et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Bish et al.

20. Claims 18 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 1, 3, 4, 6, 9-14, 16, 17, 19-23, 28, 29, and 31 above, and further in view of Bish et al.

21. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Bish et al. as applied to claims 18 and 24-26 above, and further in view of Koning et al.

22. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al., any one of Kirsten, the background of McCormack et al., or Pennisi et al., and Bish et al. as applied to claims 18 and 24-26 above, and further in view of Koning et al.

23. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 18 and 24-26 above, and further in view of Koning et al.

24. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Bish et al. as applied to claims 18 and 24-26 above, and optionally further in view of JP2001284401.

25. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al., any one of Kirsten, the background of McCormack et al., or Pennisi et al., and Bish et al. as applied to claims 18 and 24-26 above, and optionally further in view of JP2001284401.

26. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen and Jayaraman et al. as applied to claims 18 and 24-26 above, and optionally further in view of JP2001284401.

Response to Arguments

27. Applicant's arguments filed 4/11/06 have been fully considered but they are not persuasive. It is noted claim 7 was inadvertently left out of the rejection heading for Nguyen in view of Jayaraman et al. However, as claim 7 is disclosed by Nguyen, as noted in the rejection over Nguyen, the claim is included in the current rejection of Nguyen in view of Jayaraman et al.

Applicant argues, "As to independent claims 1 and 23, Nguyen does not teach that the solder melts and reflows within the matrix prior to the time the polymer becomes cured, as required by the independent claims of the present invention. Accordingly, Nguyen does not anticipate these claims, or any of the claims dependent thereon.".

Nguyen teaches an adhesive mixture comprising a curable polymer composition, a solder powder, and a fluxing agent wherein during application the adhesive is heated above the melting point of the solder powder and the curing temperature of the curable polymer for a time sufficient to cure the polymer. Thus, as the materials and steps of Nguyen are the same as those both claimed and disclosed in applicants specification which result in reflow of the solder

powder to form interconnecting metal structures while the curable polymer composition is cured the limitation appears inherent to Nguyen.

Applicant further argues, "In addition, claims 1 and 23 specify that the polymer "hardens." Nguyen does not teach the use of polymers which become hard. Rather it describes its polymers as "elastomeric" "soft gel" "silicone rubber" upon curing, see, e.g., paragraphs [0014] – [0020]. For example, the patent states: "The resin mixture can be cured ... to form a compliant elastomer." Paragraph [0020]. ("Compliant" is defined in Nguyen to mean "yielding and formable at room temperature, as opposed to solid and unyielding." Paragraph [0018]. Thus, none of the examples disclosed in Nguyen have a resin that is hardened, as claimed in the present application.".

Applicant have used the term "harden" interchangeably with "cured" as shown by claim 1 which requires the polymer becomes "cured" and in the specification at paragraphs 11, 20, and 27. Thus, as Nguyen teaches the adhesive is cured, the adhesive is also hardened, it being noted both Nguyen and applicants disclose using silicone polymer resins. Furthermore, Nguyen teaches the adhesive is cured to form a compliant material, i.e. a hardened material having elasticity, and applicants specification in paragraph 22 specifically notes "Finally, after being cured the polymer should provide good adhesion and have sufficient elasticity to absorb any stresses generated by thermal cycling or other mechanical causes." (Emphasis added) such that inherently curing the adhesive in Nguyen to form a compliant material also hardens the adhesive.

Applicant further argues, "Jayaraman differs fundamentally from the present invention because it teaches the use of "phase change polymers." Jayaraman's phase change polymers become liquid when raised to operating temperature of the electronic device. Thus, the patent does not teach polymers which harden when cured, as claimed in the present application. The use of phase change polymers is a fundamental, core teaching of Jayaraman, such that there is no motivation to substitute a polymer that hardens.".

The claims are not commensurate in scope with this argument as the claims do not exclude "phase change polymer", it being further noted both Jayaraman et al. and applicant use silicone or epoxy polymer resins. Additionally, applicants have used the term "harden"

interchangeably with "cured" as shown by claim 1 which requires the polymer becomes "cured" and in the specification at paragraphs 11, 20, and 27. Thus, as Jayaraman et al. teach the adhesive is cured, the adhesive is also hardened, it being noted both Jayaraman et al. and applicants disclose using silicone or epoxy polymer resins. Furthermore, Jayaraman et al. specifically teach that below the operating temperature of the bonded electronic component the adhesive is solid, i.e. hardened, (Column 4, lines 33-35) such that cooling of the cured adhesive as taught by Jayaraman et al. during bonding hardens the adhesive and the limitation is met.

Applicant further argues, "Kirsten, McCormack and Pennisi each teach use of a resin that does not reflow when heated. Their teachings are directly contrary to the teachings of Jayaraman, which is directed to phase change polymers which liquefy when heated, and no motivation or suggestion has been shown for combining any these secondary references with Jayaraman. Moreover, there is no reason to believe that the fluxing agents described in Kirsten, McCormack or Pennisi have any utility with the phase change polymers of Jayaraman.".

Kirsten, McCormack et al., and Pennisi et al. are applied solely as exemplary of including a fluxing agent in compositions of the type taught by Jayaraman et al. which include compositions for forming solder interconnects from solder powder wherein the motivation to include the fluxing agent to remove surface oxides from the solder powder and allow the solder powder to better wet out is not dependent upon the particular curable polymer used.

Applicant further argues, "Claims 1 and 23 were rejected as obvious over Nguyen in view of Jayaraman. Both of these references are discussed above. It is submitted that there is no motivation shown to combine their teachings. Again, Jayaraman is directed to the use of unique phase change polymers that liquefy when heated. There is no showing that the phase change polymers of Jayaraman are compatible with the polymers of Nguyen.".

As noted above, it appears inherent to Nguyen that as the solder powder is melted while the curable polymer is cured reflow and the forming of interconnected structures occurs. Jayaraman et al. is applied in combination with Nguyen to show that in similar processes in the art, i.e. the heating of an adhesive composition comprising solder powder and a curable polymer

wherein the heating melts the solder powder while curing the curable polymer, the melting of solder powder does in fact reflow the solder powder to form interconnecting metal structures while the curable polymer is cured.

Conclusion

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **(571) 272-1216**. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John L. Goff

JEFF H. AFTERGUT
PRIMARY EXAMINER
GROUP 1300